

## Environmental Protection Agency

## Pt. 90, Subpt. D, App. A

the water trap or downstream. It may not exceed 7 °C.

### § 90.328 Measurement equipment accuracy/calibration frequency table.

(a) The accuracy of measurements must be such that the maximum tolerances shown in Table 2 in Appendix A of this subpart are not exceeded.

(b) All equipment and analyzers must be calibrated according to the frequencies shown in Table 2 in Appendix A of this subpart.

(c) Prior to initial use and after major repairs, bench check each analyzer (see § 90.323).

(d) Calibrate equipment as specified in § 90.306 and §§ 90.315 through 90.322.

(e) At least monthly, or after any maintenance which could alter calibration, perform the following calibrations and checks.

(1) Leak check the vacuum side of the system (see § 90.324(a)).

(2) Verify that the automatic data collection system (if used) meets the requirements found in Table 2 in Appendix A of this subpart.

(3) Check the fuel flow measurement instrument to insure that the specifications in Table 2 in Appendix A of this subpart are met.

(f) Verify that all NDIR analyzers meet the water rejection ratio and the CO<sub>2</sub> rejection ratio as specified in § 90.325.

(g) Verify that the dynamometer test stand and power output instrumenta-

tion meet the specifications in Table 2 in Appendix A of this subpart.

### § 90.329 Catalyst thermal stress test.

(a) *Oven characteristics.* The oven used for thermally stressing the test catalyst must be capable of maintaining a temperature of 500 ± 5 °C and 1000 ± 10 °C.

(b) *Evaluation gas composition.* (1) A synthetic exhaust gas mixture is used for evaluating the effect of thermal stress on catalyst conversion efficiency.

(2) The synthetic exhaust gas mixture must have the following composition:

Constituent	Volume percent	Parts per million
Carbon Monoxide .....	1	.....
Oxygen .....	1.3	.....
Carbon Dioxide .....	3.8	.....
Water Vapor .....	10	.....
Sulfur dioxide .....	.....	20
Oxides of nitrogen .....	.....	280
Hydrogen .....	.....	3500
Hydrocarbon* .....	.....	4000
Nitrogen = Balance	.....	.....

\* Propylene/propane ratio = 2/1.

(c) *Phase 2 engines.* The catalyst thermal stress test is not required for engine families certified to the Phase 2 standards.

[60 FR 34598, July 3, 1995, as amended at 64 FR 15243, Mar. 30, 1999]

## APPENDIX A TO SUBPART D OF PART 90—TABLES

TABLE 1—SYMBOLS USED IN SUBPART D

Symbol	Term	Unit
CO	Carbon monoxide.	
CO <sub>2</sub>	Carbon dioxide.	
NO	Nitric oxide.	
NO <sub>2</sub>	Nitrogen dioxide.	
NO <sub>x</sub>	Oxides of nitrogen.	
O <sub>2</sub>	Oxygen.	
conc	Concentration (ppm by volume) .....	ppm
f	Engine specific parameter considering atmospheric conditions.	
F <sub>FCB</sub>	Fuel specific factor for the carbon balance calculation.	
F <sub>FD</sub>	Fuel specific factor for exhaust flow calculation on dry basis.	
F <sub>FH</sub>	Fuel specific factor representing the hydrogen to carbon ratio.	
F <sub>FW</sub>	Fuel specific factor for exhaust flow calculation on wet basis.	
G <sub>AIRW</sub>	Intake air mass flow rate on wet basis .....	kg/h
G <sub>AIRD</sub>	Intake air mass flow rate on dry basis .....	kg/h
G <sub>EXHW</sub>	Exhaust gas mass flow rate on wet basis .....	kg/h
G <sub>Fuel</sub>	Fuel mass flow rate .....	kg/h
H	Absolute humidity (water content related to dry air) .....	gr/kg
i	Subscript denoting an individual mode.	
K <sub>H</sub>	Humidity correction factor.	
L	Percent torque related to maximum torque for the test mode .....	percent